VEHICULAR PARKING SYSTEM USING IOT WITH FCFS AND ROUND ROBIN SCHEDULING ALGORITHMS

Synopsis Submitted to the IIMT University in Partial Fulfillment of the Requirements for the Award of the Degree

of

DOCTOR OF PHILOSOPHY

In

Computer Science

By

Bhupendra Ram

Part time

Under the guidance of

Dr. Shubham Kumar
School of Computer Science and Applications IIMT University, Meerut

IIMT University, Meerut

(School of Computer Science and Applications IIMT University, Meerut)
October-2022

TABLE OF CONTENTS

1. INTRODUCTION 3
2. LITERATURE REVIEW 4
3. PROBLEM STATEMENT 6
4. RESEARCH OBJECTIVE 7
5. RESEARCH METHODOLOGY 8
6. SCOPE OF RESEARCH 10
7. RESEARCH SCHEDULE 11
8. CONCLUSION 12
9. REFERENCES 13

INTRODUCTION

By developing a novel approach for handle parking problem in the crowded big city, we are demonstrating the IOT based vehicular parking system that will provide us efficient parking space utilization and will reduce vehicle searching time using FCFS(Queue allocation of vehicles) and Round Robin(Load balancing) scheduling Algorithm. For illustrating the technique we will use IR sensors, DC Motors, WIFI Modem and AVR micro controller and ultrasonic sensors.IR sensors are used for checking parking slot availability. For opening and closing the gate we are using DC motors. We will use WIFI modem for internet connection and AVR microcontroller is used as whole system operator. We will use IR Technology for opening the gate automatically if any vehicular arrives at the gate. The system will read the available parking slot and update the cloud server and we can check availability of parking slot online. We will use ultrasonic sensors which will find available parking location. We will provide available parking slot to the user by using FCFS and round robin scheduling algorithms. FCFS and round robin scheduling algorithms will provide different-different scenario for different possible ways. We are using FCFS for queue allocation of vehicles and round robin scheduling algorithm for load balancing. This IOT based system will provide a solution for parking issues in crowded and big city. And users will find a efficient IOT based vehicular parking management system

LITERUTURE REVIEW-

Literature review tells the past history of vehicular based parking system using different-different technique. Today traffic congestion is common problem in the crowed and big cities. It is due to rapid development of technology. Users are using vehicles even the small distance area. This is a big threat for those countries especially where IOT based technology is developing rapidly. The problem is increasing rapidly day by day and hour by hour. And maximum people in countries wants to find solution of traffic problem and parking area so that they can save their time. In the starting low budget model was came in market for finding solution of available parking space on the parking area. First of all the LIDAR system was came in market for finding distance of the city and parking locations. This machine learning system provides higher accurate data. This data which we have obtained from this model was sent to drivers. Drivers are ready to access parking slot. This model had gained low cost and low production time. Drivers gained parking slot automatically by which performance increases and searching time reduces.

In recent technological development, automatic counting for parking slots were proposed that will find allotted space automatically. A suitable technique was proposed with low budget with Zigbee technology. This technology views incoming user and outgoing user. This technology provides solutions of traffic jam problem due to advancement in technology. In this model we had gained optimized results which are satisfying some points. In recent development a new technique automatic parking system based on convolution neural networks (CNNs) was proposed. This system finds parking space recognition. For checking whether this system has advantage over Zigbee we had tested many experiments and finds results. Results shows CNNs is better than Zigbee.

In modern technological development, a new technique for vehicular parking system was proposed. The name of this technique is IOT based smart parking system using FCFS priority scheduling. Mainly this model is used for allocating users available parking slot in big cities and university campus and different parking area and locations. In this technique infrared and ultrasonic sensors is used which is used to find available parking slots. This system uses FCFS scheduling algorithm for allotment of vehicles to the free parking slots on first co come first serve basis and priority basis. This technique reduces vehicle search time using fcfs scheduling and IOT based parking system and sensor devices. Finally we have tested IOT based vehicular parking system using FCFS

Priority scheduling algorithm compare to Zigbee and CNNs. The results shows CNNs is better than Zigbee and FCFS priority based scheduling algorithm is better than CNNs.These results we have showed in research schedule.

PROBLEM STATEMENT-

The conventional developed techniques using priority scheduling for IoT based parking vehicles becomes costly and vehicle search time is usual. So we are proposing a new novel algorithms for parking vehicles using **FCFS (For queue allocation of vehicle) and Round Robin (Load Balancing) scheduling algorithms**. This approach will provide good results showing specification like efficiency and vehicle searching time.

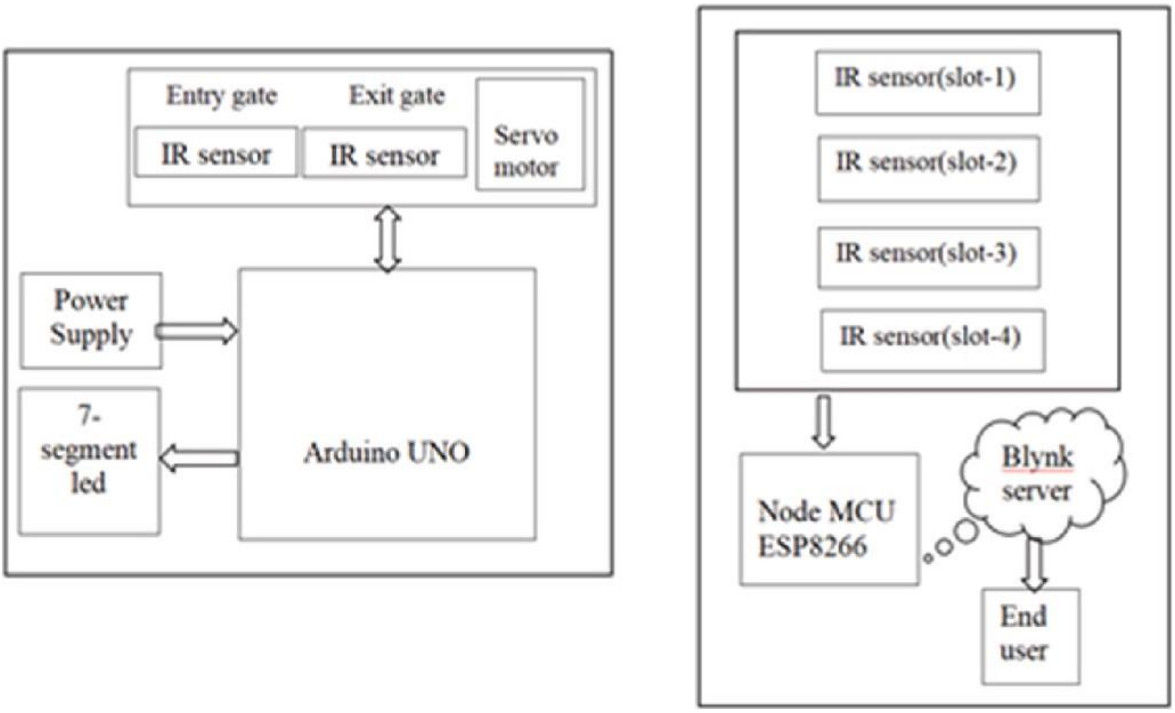
RESEARCH OBJECTIVE

There are many objective of research on academics and industry which are using this technology. The main objective of research is to improve efficiency and vehicle searching time over traditional system like Zigbee, CNNs and FCFS Priority scheduling. After successful development of this research, we will use it for academic and industry. Academic is a way by which we can transfer knowledge to industry. Most companies are providing value to the research. Academic involvement is not new thing. It has a old tradition. University focuses technical and practical knowledge as part of their mission. This research gives future to students and scholars.

Industry is also using this research for increasing work and technological advancements. Research is using as a predictor in industry and it is using a factor analysis in industry. The research paper contributes to the literature for university and institution. It also provides interaction between institution and industry. This research focuses on university research center

RESEARCH METHODOLOGY

It is found in survey that traffic jam problem in crowded big city is a major problem in country. And we are providing a solution for traffic jam in parking area by providing a model vehicular parking system using IOT with fcfs and round robin scheduling algorithms. we have implemented this model in two parts. In first part we have implanted FCFS scheduling algorithms. This algorithms provide queue allocation for vehicular in a efficient way. In the second part we have implemented round robin scheduling algorithms. This algorithm provides load balancing effectively. Here we are using different-different types of sensors like IT sensors and ultrasonic sensors etc for finding free parking slot for vehicles. The proposed system is given following.



(Block diagram of the system.)

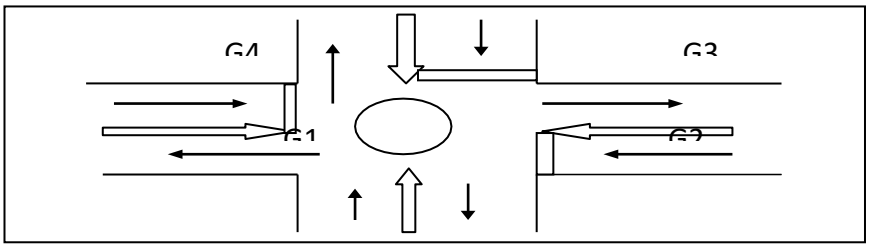
FCFS scheduling algorithms-

First come first serve scheduling algorithms is an important algorithm which is mostly used in vehicular parking system. This algorithm provides us booking of parking slots at the arrival of vehicles on the basis of first come first serve. This booking task continues until the free slot is available. If all the slots are occupied then it waits to be freed previously occupied slot. FCFS scheduling algorithms mainly used for queue allocation of vehicles and improves efficiency and reduces vehicle searching time.

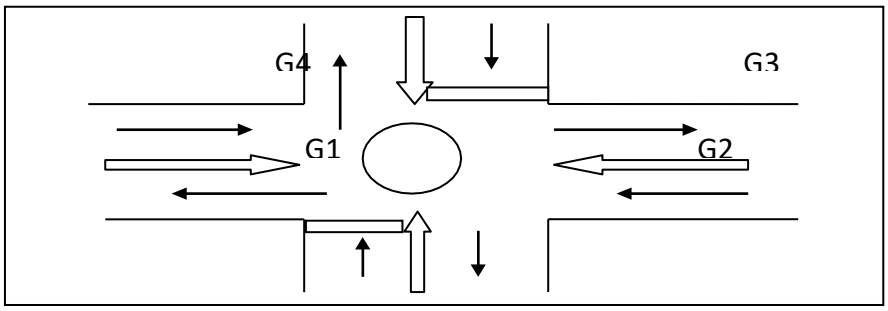
Round Robin scheduling algorithms

Round robin scheduling algorithm is used for load balancing. By using this scheduling algorithm we will complete our task in four parts. These are given following.

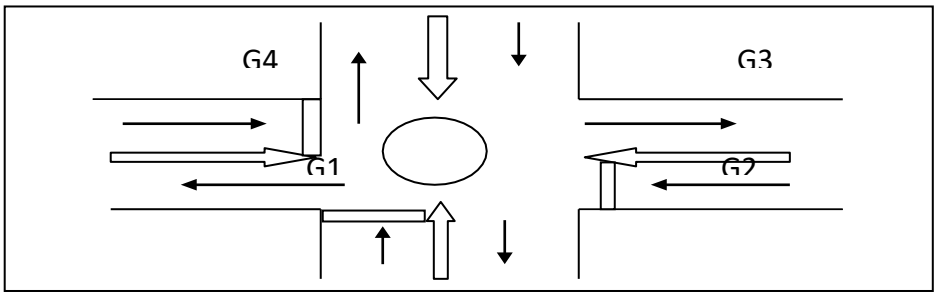
Part 1: In this part out of the four gate only one gate is open and other gate will be closed. There are four gate G1, G2, G3, G4. In this part gate G1 will remains open and other gate will be closed. And the vehicles belongs to Gate1 will go in their destination.



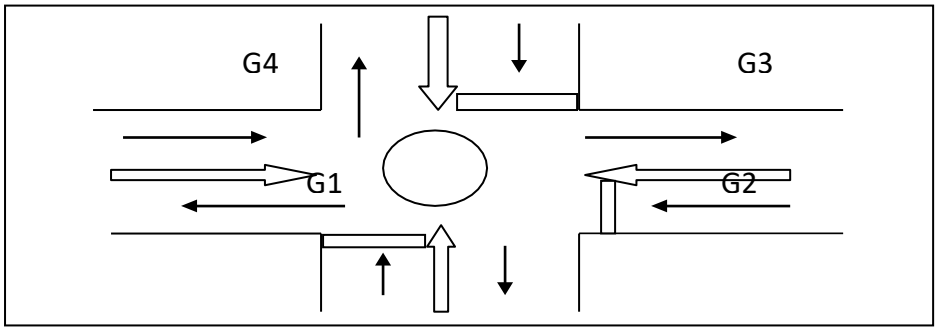
Part 2: After a fix time which is controlled by microcontroller the gate 2 will open. And other gate will be closed. These gates are closed by a barrier. And vehicles belongs to gate 2 will go in their destination.



Part 3: After a fix time the barrier of gate 3 will be open and the barrier of other gate will be closed. And the vehicles belongs to road 3 will go their destination



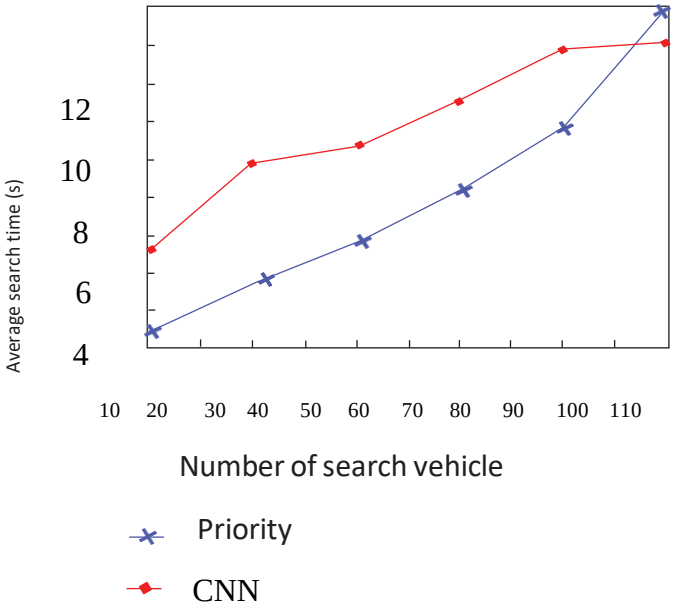
Part 4: In this part gate G4 will open and other gate will be remain closed. And the vehicles belongs to gate 4 will go in their destination



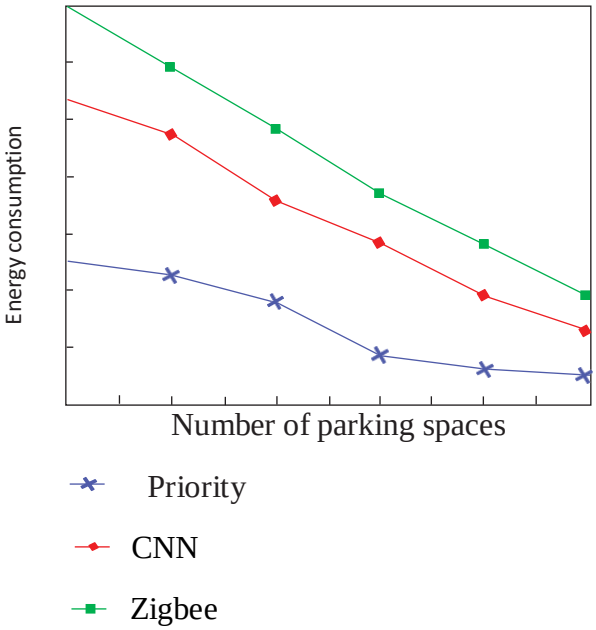
SCOPE OF RESEARCH

The scope describes the area to which the research area will be explored in the work and gives parameters within the study will be operating. Automatic vehicular parking system using IOT with FCFS and Round Robin scheduling algorithms helps to minimize the vehicular parking area. In the recent world, where vehicle parking has become a very complex problem, it is necessary to avoid the wastage of space in big companies and apartment's etc.The research has improved the efficiency and increases efficiency and reduces vehicle searching time. Vehicular parking solution is given by this research has a important role in smart cities, improvement in convenience, congestion, urban mobility, practical information and intelligence delivery. It also reduces cost. A digital smart city has increases the demand of vehicular parking services. This research work also provides scope in FCFS and round robin algorithms for reducing cost and reducing vehicular search time. Researcher can work on these algorithms in future and can establish better result than these algorithms.

RESEARCH SCHEDULE



(Comparison of system consumption time.)



(Comparison of system energy consumption

CONCLUSION

By proposing this research on vehicular parking system using IOT with FCFS and round robin scheduling algorithm it becomes very important that we can introduce our solution in our country and all over the world. The advantages are improved efficiency and reduced vehicle search time. This system will provide a sustainable vehicular parking system in smart cities eco system. It will give security in parking area. It provides solution in the parking area and traffic jam.

This system will promote automation engineering which will give advancement in new developing technology. So we should must implement this research and contribute in our countries technology development and all over world's development. This system will provide a real time process and accurate information of parking slot. This research increases performance by improving efficiency and by reducing vehicle search time. It resolves a solution of traffic jam in the cities. In the future user can park his vehicle by using online services. We can also add reservation facilities in the future

REFERENCES-

[1] M.R.M. Veeramanickam ,* , B. Venkatesh , Laxmi A. Bewoor , Yogesh W. Bhowte , Kavita Moholka , Jyoti L. Bangare IoT based smart parking model using Arduino UNO with FCFS priority scheduling, 2665-9174@2022.

[2] Marouane EL Midaoui1 *, Mohammed Qbadou1 , and Khalifa Mansouri1,Priority-based parking system for university campus using IOT and CVRP, E3S Web of Conferences 336, 00029 (2022).

[3] Yucheng Guo 1 and Hongtao Shi 2,Automatic Parking System Based on Improved Neural Network Algorithm and Intelligent Image Analysis, Volume 2021, Article ID 4391864, 12 pages.

[4] M.R.M. VeeraManickam, M. Mohanapriya, B.K. Pandey, et al., Map-Reduce framework based cluster architecture for academic student's performance prediction using cumulative dragonfly based neural network, Cluster Comput. 22 (2019) 1259–1275.

[5] M.M. Badr, et al., Smart parking system with privacy preservation and reputation management using blockchain, IEEE Access 8 (2020).

[6] Y. Allbadi, J.N. Shehab, M.M. smart parking system using ultrasonic control sensors", 2nd International Scientific Conference of Engineering Sciences (ISCES 2020). IOP Conf. Series: Materials Science and Engineering, vol. 1076, 2021.

[7] Q. Xu, et al., Wireless AI in smart car: how smart a car can Be? IEEE Access 8 (2020).

[8] P. Solic, ˇ et al., IoT-ready energy-autonomous parking sensor device, IEEE InternetThingsJ.8 (6) (2021), https://doi.org/10.1109/JIOT.2020.3031088. March 15, ISSN: 2327-4662.

[9] G. Detection of alzheimers disease from MRI using convolutional neural network with tensorflow. https://arxiv.org/abs/1806.10170, 2018.

[10] H. Zhang, X. Lu, Vehicle communication network in intelligent transportation system based on Internet of ings, Comput. Commun. 160 (2020) 799–806.

[11] W. Li, Design of smart campus management system based on internet of things technology, J. Intell. Fuzzy Syst. 40 (2) (2021) 3159–3168.

[12] M. Abidin, R. Pulungan, A systematic review of machine-vision-based smart parking systems, Scientific Journal of Informatics 7 (2) (2020). November 2020,

[13] L. Eyraud-Dubois, G. Mouni´e, D. Scheduling algorithms with reservations", parallel and distributed processing symposium, in: IPDPS 2007, IEEE International, 2007.

[14] M.G. Diaz Ogas, ´ R. Fabregat, S. Aciar, Survey of smart parking systems, Appl. Sci. 10 (2020) 3872.

[15] H. Zhang, X. Lu, Vehicle communication network in intelligent transportation system based on Internet of ings, Comput. Commun. 160 (2020) 799–806.

[16] " design and evaluation of parking route based on automatic assignment mechanism of parking lot", Advances in Mechanical Engineering 9 (7): 1-9.

[17] Uesugi, Kentaro, Mukai, Naoto and Watanabe, Toyohide. (2007) "Optimization of Vehicle Assignment for Car Sharing System", In Springer International Conference on Knowledge-Based and Intelligent Information and Engineering Systems: 1105-1111.

[18] Fan, Junkai, Hu, Qian and Tang, Zhenzhou. Vacant parking space availability: an SVR method with fruit fly optimization", IET Intelligent Transport Systems 12 (10): 1414-1420.